



More than meets the eye

Selecting a bucket for a front shovel or backhoe doesn't sound like a big deal to the casual observer. Subtle differences, however, can have a significant impact on meeting production targets.

To unpack the selection process, we spoke with two of our mining experts: Area Manager for Komatsu Germany "Mining Division", Bryce Short, and Wayne Gordon, SMS Equipment's Senior Engineer.



Safety is always top of mind when considering matching a bucket to a machine.

Q1: What are the factors that influence bucket selection?

Bryce: First of all, Komatsu optimizes standard bucket designs for all types of materials and applications. There's no variation in shape, whether you're in a gold mine, the oil sands, or an iron ore mine. The size of the bucket is what changes. The first consideration we look at is material density. If you're moving a heavy material like iron ore, for example, you're going to use a smaller bucket to accommodate that higher tonnage per cubic metre.

Other factors will influence the size of a typical load, such as bucket fill, material type, and operator skill level. Front shovel and backhoe

(in diesel or electric) require other considerations such as the bench height or digging depth.

We also look at the characteristics of the material, such as rock size, swell factor, and whether you're digging blasted or unblasted material is critical, all of which influence the kind of teeth you need. Another vital consideration is the abrasiveness of the material that will help determine the liner package to prolong the life between rebuild of the bucket.



Our understanding of the mining industry helps us develop custom manufacturing solutions that genuinely meet your needs and often exceed expectations.

Q2: Why is bucket sizing important?

Bryce: Safety is at the top of the list. Sizing the bucket to the material density is a major consideration required to protect the machine's stability.

The other side of the coin is productivity. Ideally, the goal is to match the correct bucket to the truck size for effective 3, 4, or 5 pass loading,

allowing maximum machine productivity and optimizing the lowest cost per tonne.

Wayne: Bucket size is part of the optimization picture where you have the right size equipment, the right size bucket, and the right numbers of machinery to meet the target production. Bucket size is a critical link in the production chain, and other aspects of the operation depend on it.

Q3: What's involved in making the best choice?

Wayne: We have an application engineering group that includes bucket selection as part of a larger picture. We offer a site visit to the customer to collect data such as; material density, production requirements, haul road distances, and other conditions. Then we use simulation software to assess all of the scenarios given the type of material, the nature of the work, etc. And that might include, by the way, other equipment such as the trucks moving the ore or the size and number of machines that will deliver the optimum result.

These studies allow us to make an informed recommendation for our customers on the right bucket, equipment, and the number of machines required to meet the production target.

Bryce: For selecting bucket size, we involve our Engineering department by using a form called the Bucket Application and Request Sheet (BARS). The BARS will help us gather all the material and application information, and together with multiple validations, we can provide optimal recommendations.

Q4: What if a particular option isn't available?

Wayne: We get many modification and custom builds requests, such as oversized buckets. We get many modification and custom builds requests, such as oversized buckets, oversize dump bodies, liner packages, etc. All these things must be designed according to equipment requirements and require approval.

We start with engineering studies to support this. The critical point is that any modification has to be approved by the manufacturer. So we look at it from both the approval and efficiency sides. For example, if a customer wants to put a liner package into a bucket to prolong its life, the payload will have to be adjusted downward because of the extra weight of the liner package.



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Q5: What is the best advice you can share?

Bryce: SMS Equipment and Komatsu provide expert solutions to optimize mining operations. We have tons of experience and have dealt with the most challenging and unique applications. Delivering full transparency into the mine's production goals, targets, and timelines will allow our team to provide robust solutions to meet requirements, whether digging heavier iron ore or lighter material such as coal. As mentioned previously, how abrasive the material is, has to be considered for selecting the correct wear package

Wayne: The importance of collaborative engineering studies upfront is vital, and many people don't know that we provide them. We have seen instances in which teams are pretty sophisticated in doing this sort of thing, but others could make good use of the resources that we have for this.

Q6: What resources does SMS Equipment provide?

Bryce: SMS Equipment is the connector between mine operators and the manufacturer. Our work is really about optimization and helping create the right combination of shovel or backhoe, buckets, and capacity. Our role is to help support that process and help drive success, ultimately finding the lowest cost per ton option. We have the resources to do studies and communicate directly with the certification process. SMS Equipment has experience

with hundreds of pieces of mining equipment across Canada, so there's no situation they haven't seen before.

Wayne: We have engineers that assess situations on mine sites and have the technology for conducting software-based simulations. We also add some unique perspectives on Canadian mining. For example, things tend to break in minus 40 degrees Celsius from an efficiency and durability standpoint. So extreme cold weather is always a factor in all of our equipment lines.



We bring in a highly-skilled, fully-functional group who understand what it takes to run a mine site. It's a partnership, and you'll know it's successful when the only difference between your technicians and our own is the branding on their coveralls

The Bottom Line: The bucket on a machine carries the payload, and the optimum selection will ensure the maximum overall productivity of the equipment, including the excavators and haul trucks. Selection involves many variables, including density and other material characteristics and the specifics of the application. **SMS Equipment and Komatsu provide engineering resources to help mine operators make the best choice.**

| Next Steps:

Our in-depth understanding of the mining industry has helped us provide mining-specific solutions, which means solutions unlike any other industry on earth.

